

AMENDMENTS TO THE CLAIMS

Please cancel claims 1-12 without prejudice or disclaimer of their underlying subject matter.

Please amend the claims as follows.

Claims 1-12. (Canceled)

13. (Previously presented) A corneal surgery apparatus for ablating a cornea of a patient's eye by irradiation of a laser beam, the apparatus comprising:

an irradiation optical system for irradiating the laser beam onto the cornea;

input means for inputting a first anterior-segment image of the eye picked up in a condition where measurement data for determining corneal ablation data is obtained;

image-pickup means for picking up a second anterior-segment image of the eye in a condition where the laser beam is irradiated, the second anterior-segment image including images of marks for torsion-detection provided outside an ablation area of the eye;

first correction means for detecting characteristic points common to the first anterior-segment image and the second anterior-segment image which is picked up before the corneal ablation, obtains a first torsion-error angle that occurred before the corneal ablation based on the detected characteristic points, and performs any one of rotation of a patient's head and correction of control data on the irradiation optical system so as to correct the obtained first torsion-error angle; and

second correction means for obtaining a second torsion-error angle that occurred during the corneal ablation based on the mark images in the second anterior-segment image picked up before the corneal ablation after correction of the first torsion-error angle and the mark images in

the second anterior-segment image picked up during the corneal ablation, and performs any one of rotation of the patient's head while stopping the irradiation of the laser beam and correction of the control data on the irradiation optical system so as to correct the obtained second torsion-error angle.

14. (New) A corneal surgery apparatus for ablating a cornea of a patient's eye by irradiation of a laser beam, the apparatus comprising:

- an irradiation optical system for irradiating the laser beam onto the cornea;
- input means for inputting a first anterior-segment image of the eye picked up in a condition where measurement data for determining corneal ablation data is obtained;
- image-pickup means for picking up a second anterior-segment image of the eye in a condition where the laser beam is irradiated, the second anterior-segment image including images of marks for torsion-detection provided outside an ablation area of the eye;
- characteristic point detection means for detecting characteristic points common to the first anterior-segment image and the second anterior-segment image;
- mark detection means for detecting the mark images in the second anterior-segment image;
- torsion-detection means for automatically obtaining a torsion-error angle of the eye; and
- torsion-correction means for automatically correcting the obtained torsion-error angle,

wherein the torsion-detection means automatically obtains, based on the characteristic points in the first anterior-segment image and the characteristic points in the second anterior segment image picked up before the corneal ablation, a first torsion-error angle that occurred before the corneal ablation,

the torsion-correction means automatically performs any one of rotation of a patient's head and correction of control data on the irradiation optical system based on the obtained first torsion-error angle so as to correct the obtained first torsion-error angle,

the torsion-detection means automatically obtains, based on the mark images in the second anterior-segment image picked up before the corneal ablation after correction of the first torsion-error angle and the mark images in the second anterior segment image picked up during the corneal ablation, a second torsion-error angle that occurred during the corneal ablation, the torsion-correction means automatically performs any one of rotation of the patient's head while stopping the irradiation of the laser beam and correction of the control data on the irradiation optical system based on the obtained second torsion-error angle so as to correct the obtained second torsion-error angle.

15. (New) The corneal surgery apparatus according to claim 14, further comprising display means for displaying the first and second anterior-segment images,

wherein the characteristic point detection means includes designation means for designating the characteristic points based on the displayed images.

16. (New) A corneal surgery apparatus for ablating a cornea of a patient's eye by irradiation of a laser beam, the apparatus comprising:

an irradiation optical system for irradiating the laser beam onto the cornea;

an input unit which inputs a first anterior-segment image of the eye picked up in a condition where measurement data for determining corneal ablation data is obtained;

an image-pickup unit which picks up a second anterior-segment image of the eye in a condition where the laser beam is irradiated, the second anterior-segment image including

images of marks for torsion-detection provided outside an ablation area of the eye;

a characteristic point detection unit which detects characteristic points common to the first anterior-segment image and the second anterior-segment image;

a mark detection unit which automatically detects the mark images in the second anterior-segment image;

a torsion-detection unit which automatically obtains a torsion-error angle of the eye; and

a torsion-correction unit which automatically corrects the obtained torsion-error angle,

wherein the torsion-detection unit automatically obtains, based on the characteristic points in the first anterior-segment image and the characteristic points in the second anterior-segment image picked up before corneal ablation, a first torsion-error angle that occurred before the corneal ablation,

the torsion-correction unit automatically performs any one of rotation of a patient's head and correction of control data on the irradiation optical system so as to correct the obtained first torsion-error angle,

the torsion-detection unit automatically obtains, based on the mark images in the second anterior-segment image picked up before the corneal ablation after correction of the first torsion-error angle and the mark images in the second anterior-segment image picked up during the corneal ablation, a second torsion-error angle that occurred during the corneal ablation, and

the torsion-correction unit automatically performs any one of rotation of the patient's head while stopping the irradiation of the laser beam and correction of the control data on the irradiation optical system so as to correct the obtained second torsion-error angle.

17. (New) The corneal surgery apparatus according to claim 13, further comprising an irradiation control means for controlling the irradiation of the laser beam,

wherein the irradiation control means stops the irradiation of the laser beam when the obtained second torsion-error angle is beyond a permissible range.

18. (New) The corneal surgery apparatus according to claim 14, further comprising an irradiation control means for controlling the irradiation of the laser beam,

wherein the irradiation control means stops the irradiation of the laser beam when the obtained second torsion-error angle is beyond a permissible range.

19. (New) The corneal surgery apparatus according to claim 15, further comprising an irradiation control means for controlling the irradiation of the laser beam,

wherein the irradiation control means stops the irradiation of the laser beam when the obtained second torsion-error angle is beyond a permissible range.

20. (New) The corneal surgery apparatus according to claim 16, further comprising an irradiation control unit which controls the irradiation of the laser beam.